SECTION 18 The Respiratory System

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1. A full-term infant has approximately 25 million alveoli; an adult nearly 300 million alveoli. The growth of new alveoli occurs during the first 2 years of life and is complete by the age of

A. 4 years
B. 6 years
C. 8 years
D. 10 years
E. 12 years

2. Gas exchange depends on alveolar ventilation, pulmonary capillary blood flow, and the diffusion of gases across the alveolar-capillary membrane. PaO_2 does not improve with supplemental oxygen in

A. asthma
B. bronchopulmonary dysplasia
C. pneumonia
D. cyanotic heart disease
E. atelectasis

PaO 2does not improve with supplemental oxygen in cyanotic heart disease, pulmonary arteriovenous malformation, and pulmonary edema.

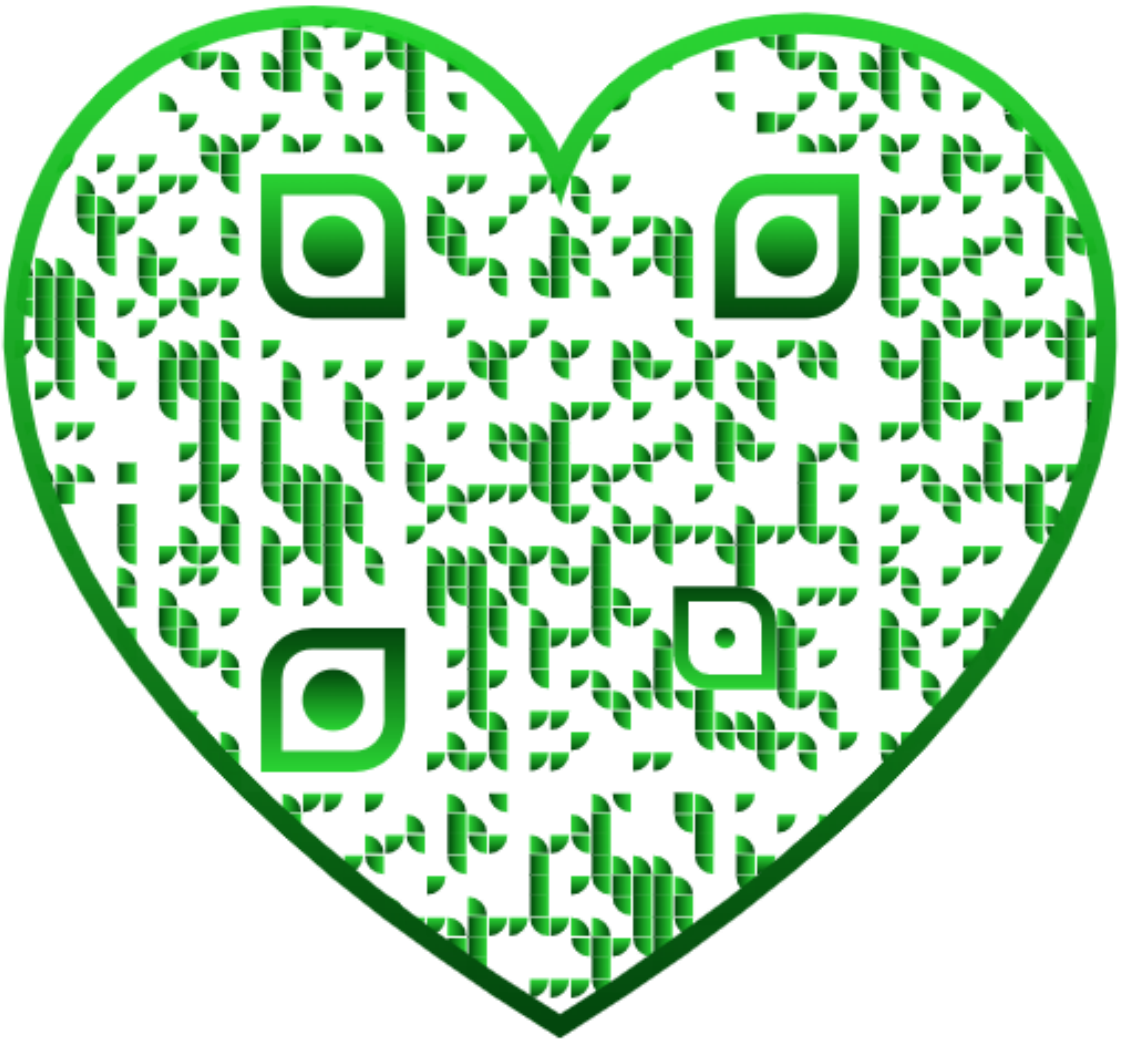
3. Hyperresonant chest percussion is elicited in one of the following disease processes

A. consolidation
B. bronchospasm
C. pneumothorax
D. atelectasis
E. interstitial process

Consolidation=Dull
Pneumothorax=Resonant
Atelectasis=Dull
Interstitial process=Normal

4. Chronic cough is defined as a daily cough lasting longer than

A. 2 weeks
B. 3 weeks
C. 4 weeks
D. 6 weeks
E. 12 weeks



5. Magnetic resonance imaging (MRI) is useful in visualizing

A. cardiac anatomy
B. pulmonary parenchymal lesions
C. pleural masses
D. bronchiectasis
E. mediastinal lesions

6. Ultrasonography is the imaging procedure of choice for assessing

A. empyema
B. mediastinal lesions
C. pulmonary parenchymal lesions
D. congenital pulmonary malformations
E. great vessel anatomy

7. The Pco_2 from a capillary sample is similar to that from arterial blood. The Pco_2 in venous samples is approximately higher than arterial Pco_2 by

A. 4 mm Hg
B. 6 mm Hg
C. 8 mm Hg
D. 10 mm Hg
E. 12 mm Hg

8. Measurement of lung volumes and airflow rates using spirometry are important in assessing pulmonary disease. These measures are compared to predicted values which rely mostly on patient

A. height
B. age
C. gender
D. race
E. weight

During the forced expiratory maneuver, forced vital capacity (FVC), forced expired volume in the first second (FEV1), and forced expiratory flow (FEF) rates are measured. These are compared to predicted values based on patient age, gender, and race, but rely mostly on height.

9. Supplemental O_2 may be delivered by a variety of face-mask systems ranging from a simple face mask, which can provide 30% to 40% O_2, to a nonrebreather mask with reservoir that can provide nearly

A. 60% O_2
B. 70% O_2
C. 80% O_2
D. 90% O_2
E. 100% O_2

10. The acceptable O_2 saturation depends on the patient and clinical situation. Generally, supplemental O_2 should be administered to achieve goal saturation level above

A. 80%
B. 85%
C. 90%
D. 93%
E. 95%

11. Chest physiotherapy is most beneficial in children with

A. foreign body inhalation
B. cystic fibrosis
C. asthma
D. pneumonia
E. atelectasis

Because its chronic secretory disease

Sudden

12. An acute life-threatening event (ALTE) is defined as any unexpected and frightening change in condition characterized by apnea, color change (usually blue or pale), sudden limpness, choking, or gagging.
Of the following, the **MOST** likely cause is

A. breath-holding spells
B. intracranial bleeding
C. pertussis
D. meningitis
E. gastroesophageal reflux

sudden SOB → foriegn Body
sudden chocking + cyanosis → GERD

13. The decreased incidence of SIDS during the past two decades explained partly by

A. widely advocated supine sleeping position
B. ECG monitoring to detect prolonged Q-T interval
C. avoiding soft bedding
D. decreasing maternal cigarette smoking
E. avoiding parents to share beds with their infants

14. the most common cause of obstructive sleep apnea syndrome (OSA) in young children is

A. obesity
B. craniofacial malformations
C. glossoptosis

D. neuromuscular diseases
E. adenotonsillar hypertrophy

15. The **MOST** common non-infectious cause of inspiratory stridor in infants is
A. subglottic stenosis
B. laryngeal web
C. airway hemangioma
D. rhinitis
E. laryngomalacia

16. Barking cough is not a feature in
A. laryngotracheobronchitis
B. laryngitis
C. spasmodic croup
D. epiglottitis
E. bacterial tracheitis

17. A newborn presented with respiratory distress relieved by crying.
Of the following, the **MOST** likely cause is
A. choanal atresia
B. micrognathia
C. macroglossia
D. laryngeal web
E. congenital subglottic stenosis

18. Croup, or laryngotracheobronchitis, is the most common infection of the middle respiratory tract.
Of the following, The **MOST** common cause of croup is
A. influenza virus
B. parainfluenza virus
C. adenovirus
D. rhinovirus
E. human metapneumovirus

19. An 18-month-old child presented with a second attack of sudden onset of harsh barking cough, hoarseness, and inspiratory stridor at night without a significant upper respiratory tract prodrome.
Of the following, The **MOST** likely diagnosis is
A. bacterial tracheitis

Differential diagnosis
- **Acute laryngitis**
  - Less severe croup (inspiratory stridor)
  - No respiratory distress
- **Spasmodic laryngitis**
  - Viral but may be allergy or psychogenic (afebrile illness)
  - Occurs at midnight
  - Less severe
  - Recurrence is common
- **Acute epiglottitis and acute tracheitis** : see later

B. epiglottitis
C. spasmodic croup
D. laryngotracheobronchitis
E. foreign body aspiration

20. Vocal cord paralysis is an important cause of laryngeal dysfunction. Paralysis may be unilateral or bilateral and is more often caused by
A. Arnold-Chiari malformation
B. hydrocephalus
C. intracranial hemorrhage
D. damage to the recurrent laryngeal nerve
E. stroke

Post surgery

21. The **MOST** common foreign bodies aspirated by young children are
A. nuts
B. small toys
C. coins
D. rubber balloons
E. handwatch batteries

22. Kartagener syndrome is the triad of
A. situs inversus, pansinusitis, and bronchiectasis
B. dextrocardia, pansinusitis, and bronchiectasis
C. situs inversus, recurrent otitis media, and bronchiectasis
D. situs inversus, recurrent otitis media, and infertility
E. situs inversus, pansinusitis, and asthma

Cilia dysgenesis so mucous accumulation

23. The primary cause of bronchiolitis is
A. human metapneumovirus
B. parainfluenza viruses
C. rhinoviruses
D. coronaviruses
E. respiratory syncytial virus

First 2 years

Croup 6mo – 6yo
para-influenza

24. It may be difficult to differentiate asthma from bronchiolitis by physical examination, but all the following may be helpful **EXCEPT**
A. age of presentation
B. fever
C. personal history of asthma

Bronchiolitis occurs primarily in the first year of life and is accompanied by fever, whereas asthma usually presents in older children with previous wheezing episodes typically unaccompanied by fever unless a respiratory tract infection is the trigger for the asthma exacerbation.

D. family history of asthma
E. wheezing

25. Bronchiolitis treatment consists of supportive therapy including all the following **EXCEPT**

A. respiratory monitoring
B. bronchodilators
C. control of fever
D. hydration
E. upper airway suctioning

26. Monthly injections of palivizumab**,** a RSV-specific monoclonal antibody, initiated just before the onset of the RSV season confers some protection from severe RSV disease. Palivizumab is indicated for some infants under 2 years old with

A. spasmodic croup
B. very low birth weight
C. cyanotic congenital heart disease
D. GERD
E. recurrent pneumonia

Prevention

- Meticulous hand hygiene is the best measure to prevent nosocomial transmission.
- Monoclonal antibody to RSV F protein (Palivizumab) I.M is given before and during RSV season for *risky infants < 2 yr of age* with:
  - Chronic lung disease
  - Gestational age is less than 35 weeks
  - Comorbidities e.g. congenital heart disease, immunodeficiency, neuromuscular disorders

27. The **MOST** common bacterial cause of lobar pneumonia in children of any age outside the neonatal period is

Diffuse not Lobar
Atypical pneumonia
RSV

A. M. pneumoniae
B. Chlamydophila pneumoniae
C. Streptococcus pneumoniae
D. Staphylococcus aureus
E. Hemophilus influenza

28. The **MOST** common cause of afebrile pneumonia in infants 1 to 3 months of age is

A. Chlamydia trachomatis
B. Mycoplasma hominis
C. Ureaplasma urealyticum
D. Cytomegalovirus
E. Bordetella pertussis

29. Infectious agents that commonly cause community-acquired pneumonia vary by age.
Of the following, the **MOST** common pathogen in 3 months to 5 years age group is

Category		Etiologic agents
Bacterial	–	Gram-positive: e.g. Strept Pneumonae, group B and A streptococci ,Staphylococcus aureus
	–	Gram-negative: e.g. H.influenzae , Legionella, Klebseilla
Viral	–	Respiratory syncytial virus (RSV) parainflenza , influenza , adenovirus, Human metapneumovirus, Corona virus
Atypical	–	Mycoplasma pneumoniae , *Chlamydophila pneumoniae*
	–	Chlamydia trachomatis (in infants)
Mycobacterial	–	Tuberculosis and atypical mycobacteria
Aspiration	–	Oral anaerobic flora, with or without aerobes
Allergic	–	Esinophilic pneumonia (Loffler's syndrome)
Rickettsial	–	Coxiella Burnetii
Opportunistics in immunocompromised	–	Fungal e.g. Aspergillus , histoplasma , cryptococcus, candida
	–	Protozoal ; Pneumocystis jiroveci (carinii)
	–	Bacterila; Klebsiella, and proteus

A. respiratory syncytial virus (RSV)
B. Chlamydia trachomatis
C. Mycoplasma pneumoniae
D. group A streptococcus,
E. Staphylococcus aureus

30. Pneumonia in older patients with cystic fibrosis is usually caused by
A. Pseudomonas aeruginosa
B. Staphylococcus aureus
C. Chlamydia trachomatis
D. Mycoplasma pneumoniae
E. Hemophilus influenza

31. Immunizations have had a great impact on the incidence of pneumonia caused by all the following **EXCEPT**
A. pertussis
B. diphtheria
C. measles
D. Haemophilus influenza type b
E. Mycoplasma pneumoniae

32. In general viral pneumonias are associated more often with
A. chills
B. dyspnea
C. wheezing
D. higher fever
E. auscultatory findings of lung consolidation

Rsv in broncholitis cause wheezing
نفس الشيء بالنيمونيا

33. Mild eosinophilia is characteristic of infantile pneumonia caused by
A. Pseudomonas aeruginosa
B. Staphylococcus aureus
C. Chlamydia trachomatis
D. Mycoplasma pneumoniae
E. Hemophilus influenza

34. Blood cultures should be performed on hospitalized children to attempt to diagnose a bacterial cause of pneumonia. Blood cultures are positive in
A. 10% to 20% of bacterial pneumonia
B. 20% to 30% of bacterial pneumonia

C. 30% to 40% of bacterial pneumonia
D. 40% to 50% of bacterial pneumonia
E. 50% to 60% of bacterial pneumonia

35. If cold agglutinins are present in peripheral blood samples.
Of the following, the **MOST** suspected pathogen of pneumonia is
A. Pseudomonas aeruginosa
B. Staphylococcus aureus
C. Chlamydia trachomatis
D. Mycoplasma pneumoniae
E. Hemophilus influenza

Cold AIHA

يجي نيمونيا والهيموغلوبين مثلاً ١١ نوب يصير ٨

36. Most children recover from pneumonia rapidly and completely, although radiographic abnormalities may return to normal in
A. 1 to 2 weeks
B. 2 to 4 weeks
C. 4 to 6 weeks
D. 6 to 8 weeks
E. 8 to 10 weeks

37. Unilateral hyperlucent lung, or Swyer-James syndrome, is a focal sequela of severe necrotizing pneumonia in which all or part of a lung has increased translucency radiographically; it has been linked to
A. influenza virus
B. parainfluenza virus
C. adenovirus type 21
D. rhinovirus
E. human metapneumovirus

38. Pulmonary edema is the seepage of fluid into the alveolar and interstitial spaces.
Of the following, the **MOST** likely cause is
A. sepsis
B. acute respiratory distress syndrome
C. left ventricular dysfunction
D. tracheal foreign body aspiration
E. severe obstruction from hypertrophied tonsils and adenoids

ميدفع للجسم
فيرجعه ع الرئة

39. Acute respiratory failure occurs when the pulmonary system is unable to maintain adequate gas exchange to meet metabolic demands.
Of the following, the **MOST** frequent cause is

A. bronchiolitis
B. asthma
C. pneumonia
D. upper airway obstruction
E. sepsis/ARDS

-RSV → etiology
-Respiratory failure → cx
-give Rivabrin

40. One of the early signs of hypoxic respiratory failure is

A. nasal flaring
B. grunting
C. diaphoresis
D. tachypnea
E. agitation

Compensation

41. Hypercarbic respiratory failure can occur in

A. interstitial lung disease
B. croup
C. bronchiolitis
D. fungal pneumonia
E. sepsis

↑CO2 = Croup

42. Definitive diagnosis of pulmonary arterial hypertension is made by

A. ECG
B. echocardiography
C. CXR
D. cardiac catheterization
E. cardiac MRI

Rt. Ht Cath.

43. The diagnostic test of choice for pulmonary embolism is a

A. CT angiogram of the chest
B. ventilation-perfusion scans
C. Doppler or compression ultrasonography
D. pulmonary angiography
E. measurement of D-dimers

44. The sweat chloride test, which is still the standard diagnostic test for cystic fibrosis (CF), is positive if sweat chloride more than

A. 40 mEq/L
B. 50 mEq/L
C. 60 mEq/L
D. 70 mEq/L
E. 80 mEq/L

45. Which approximate percent of patients with CF are born with intestinal obstruction caused by inspissated meconium (meconium ileus)?

A. 10%
B. 20%
C. 30%
D. 40%
E. 50%

46. The diagnosis of CF should be seriously considered in any infant presenting with failure to thrive, cholestatic jaundice, chronic respiratory symptoms, or electrolyte abnormalities in the form of

A. hypernatremia, hypochloremia, metabolic alkalosis
B. hyponatremia, hypochloremia, metabolic alkalosis
C. hyponatremia, hyperchloremia, metabolic alkalosis
D. hyponatremia, hypochloremia, metabolic acidosis
E. hypernatremia, hyperchloremia, metabolic alkalosis

47. All the following are indications for sweat testing **EXCEPT**

A. chronic or recurrent cough
B. chronic or recurrent pneumonia
C. recurrent bronchiolitis
D. recurrent otitis media
E. hemoptysis

48. False negative results on sweat testing is seen in

A. edema
B. eczema
C. hypothyroidism
D. dehydration
E. malnutrition

Even with optimal pancreatic enzyme replacement, stool losses of fat and protein may be high. Fat should not be withheld from the diet, even when

49. The treatment of CF is multifactorial, but it is primarily directed toward the gastrointestinal and pulmonary complications. Presently, there is no effective single cure for cystic fibrosis.
Regarding treatment, all the following are true **EXCEPT**

A. 7% hypertonic saline delivered by nebulizer decrease the viscosity of mucus
B. antibiotics are selected based on organisms identified by sputum culture
C. common infecting organisms are Pseudomonas aeruginosa and Staphylococcus aureus
D. fat should be withheld from the diet when significant steatorrhea exists
E. fat-soluble vitamins (A, D, E, and K) are recommended

50. Transaminase elevation is common in patients with CF, and progressive cirrhosis resulting in portal hypertension is seen in

A. 1% to 3% of patients
B. 4% to 6% of patients
C. 7% to 10% of patients
D. 11% to 14% of patients
E. 15% to 20% of patients

51. The main reason for surgical correction of pectus excavatum is generally to improve

A. appearance (cosmetic reasons)
B. cardiac function
C. exercise tolerance
D. obstructive defects
E. vital capacity

52. Factors predisposing to secondary pneumothorax (underlying cause identified) include all the following **EXCEPT**

A. asthma
B. cystic fibrosis
C. trauma to the chest
D. severe necrotizing pneumonia
E. tall thin males → spontanous & Marfan?

53. In patients with recurrent or persistent pneumothoraces, sclerosing the pleural surfaces to obliterate the pleural space (pleurodesis) may be necessary. This can be done by instilling sclerosis agents like

A. rifadin
B. clindamycin
C. doxycycline
D. cephalexin
E. clarithromycin

54. Parapneumonic effusion/empyema is the most common effusion in children. Most parapneumonic effusions are due to pneumonia caused by
A. Pseudomonas aeruginosa
B. Chlamydia trachomatis
C. Mycoplasma pneumoniae
D. Streptococcus pneumoniae
E. Hemophilus influenza

↑ glucose

55. The analysis of pleural fluid is useful in differentiating a transudate from an exudate. Transudative pleural effusions have all the following criteria **EXCEPT**
A. low specific gravity (<1.015)
B. low protein content (<2.5 g/dL)
C. low lactate dehydrogenase activity(<200 IU/L
D. low white blood cell (WBC) count
E. low glucose level (<40 mg/dL)

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SECTION 18 The Respiratory System
ANSWERS
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1.**(C)**. The growth of new alveoli occurs during the first 2 years of life and is complete by 8 years of age. After this time, lung volume increases primarily by increase in alveolar dimensions, with new alveoli rarely formed.
2.**(D)**. PaO_2 does not improve with supplemental oxygen in cyanotic heart disease, pulmonary arteriovenous malformation, and pulmonary edema.
3.**(B)**.

- Consolidation=Dull
- Pneumothorax=Resonant
- Atelectasis=Dull
- Interstitial process=Normal

4.**(B)**. Common causes of chronic cough are asthma, postnasal drip (allergic rhinitis, sinusitis), and postinfectious tussive syndromes. It can also be caused by gastroesophageal reflux disease, swallowing dysfunction (infants), anatomic abnormalities (tracheoesophageal fistula, tracheomalacia), and chronic infection. Persistent cough may also be caused by exposure to irritants (tobacco and wood stove smoke) or foreign body aspiration, or it may be psychogenic in origin.
5.**(A)**. Magnetic resonance imaging (MRI), useful in visualizing cardiac and great vessel anatomy, is less useful for evaluation of pulmonary parenchymal lesions.
6.**(A).** Ultrasonography can be used to delineate some intrathoracic masses and is the imaging procedure of choice for assessing parapneumonic effusion/empyema. It is useful for assessing diaphragmatic motion in small children.
7.**(B).** The Pco_2 in venous samples is approximately 6 mm Hg higher than arterial Pco_2. The ratio of the serum bicarbonate concentration to Pco_2 determines the pH. Capillary or venous samples should not be used to assess oxygenation.
8.**(A).** During the forced expiratory maneuver, forced vital capacity (FVC), forced expired volume in the first second (FEV1), and forced expiratory flow (FEF) rates are measured. These are compared to predicted values based on patient age, gender, and race, but rely mostly on height.
9.**(E)**.
10.**(C).** Generally, supplemental O2 should be administered to achieve a goal saturation level above 90%. Normal oxygen saturation is greater than 95%. It is unnecessary to achieve 100% saturation, especially if this requires potentially toxic levels of inspired O2 for extended periods of time.

11.**(B).** Chest physiotherapy is most beneficial in children with chronic airway secretions, especially those with CF.
12.**(E)**. Gastroesophageal reflux and laryngospasm are the most common causes of ALTE, and they are associated with emesis, choking, or gagging.
13.**(A).** The widely advocated supine sleeping position explains, in part, the decreased incidence of SIDS during the past two decades.
14.**(E)**.
15.**(E)**. Laryngomalacia (floppy larynx) is the most common cause of inspiratory stridor in infants and may be aggravated by swallowing problems and gastroesophageal reflux.
16.**(D)**.
17.**(A).**
18.**(B).** The most common causes of croup are parainfluenza viruses (types 1, 2, 3, and 4) and respiratory syncytial virus.
19.**(C).** Spasmodic croup describes sudden onset of croup symptoms, usually at night, but without a significant upper respiratory tract prodrome. These episodes may be recurrent and severe but usually are of short duration. Spasmodic croup has a milder course than viral croup and responds to relatively simple therapies, such as exposure to cool or humidified air. The etiology is not well understood and may be allergic.
20.**(D)**.
21.**(A).** The most common foreign bodies aspirated by young children are food (especially nuts) and small toys.
22.**(A).**
23.**(E)**. Respiratory syncytial virus (RSV) is a primary cause of bronchiolitis, followed in frequency by human metapneumovirus, parainfluenza viruses, influenza viruses, adenoviruses, rhinoviruses, coronaviruses, and, infrequently, M**y**coplasma pneumoniae.
24.**(E)**. Bronchiolitis occurs primarily in the first year of life and is accompanied by fever, whereas asthma usually presents in older children with previous wheezing episodes typically unaccompanied by fever unless a respiratory tract infection is the trigger for the asthma exacerbation.
25.**(B).** Bronchodilators and corticosteroids are seldom effective and are not generally recommended.
26.**(B)**. Palivizumab is indicated for some infants under 2 years old with chronic lung disease, very low birth weight, and those with hemodynamically significant cyanotic and acyanotic congenital heart disease.
27.**(C).**

28.**(A).** Chlamydia trachomatis and less commonly Mycoplasma hominis, Ureaplasma urealyticum, and cytomegalovirus (CMV) cause a similar respiratory syndrome in infants 1 to 3 months of age with subacute onset of an afebrile pneumonia; cough and hyperinflation are the predominant signs.
29.**(A).** Infectious agents that commonly cause community-acquired pneumonia vary by age. Most common causes are respiratory syncytial virus (RSV) in infants, other respiratory viruses (parainfluenza viruses, influenza viruses, human metapneumovirus, adenoviruses) in children younger than 5 years old, and Mycoplasma pneumonia in children older than age 5 years.
30.**(A).** Pneumonia in patients with cystic fibrosis usually is caused by Staphylococcus aureus in infancy and Pseudomonas aeruginosa or Burkholderia cepacia in older patients.
31.**(E)**.
32.**(C).** In general viral pneumonias are associated more often with cough, wheezing, or stridor; fever is less prominent than with bacterial pneumonia. Mucosal congestion and upper airway inflammation suggest a viral infection.
33.**(C).** Mild eosinophilia is characteristic of infant C. trachomatis pneumonia.
34.**(A)**.
35.**(D)**.
36.**(D)**.
37.**(C)**. Severe adenovirus pneumonia may result in bronchiolitis obliterans and unilateral hyperlucent lung, or Swyer-James syndrome.
38.**(C).** Pulmonary edema is most commonly due to heart failure from left ventricular or biventricular dysfunction.
39.**(A).** Respiratory failure is frequently caused by bronchiolitis (often caused by respiratory syncytial virus), asthma, pneumonia, upper airway obstruction, and sepsis/ARDS. Respiratory failure requiring mechanical ventilation develops in 7% to 21% of patients hospitalized for respiratory syncytial virus.
40.**(D)**. Early signs of hypoxic respiratory failure include tachypnea and tachycardia in attempt to improve minute ventilation and cardiac output and to maintain delivery of oxygenated blood to the tissues.
41.**(B).** Hypercarbic respiratory failure can occur when the respiratory center fails as a result of drug use (opioids, barbiturates, anesthetic agents), neurologic or neuromuscular junction abnormalities (cervical spine trauma, demyelinating diseases, anterior horn cell disease, botulism), chest wall injuries, or diseases that cause increased resistance to airflow (croup, vocal cord paralysis, post-extubation edema).
42.**(D)**. Definitive diagnosis is made by cardiac catheterization, but echocardiography may confirm the presence of right ventricular hypertrophy,

ventricular dysfunction, interventricular septal flattening, and tricuspid insufficiency, which can be used to estimate the pulmonary artery pressures.

43.**(A).**

44.**(C).** It is positive (elevated sweat chloride > 60 mEq/L) in 99% of patients with CF.

45.**(A).**

46.**(B)**.

47.**(D)**.

48.**(A).**

False negative

- edema
- poor technique/inadequate sweat collection
- atypical cystic fibrosis (unusual gene mutations—uncommon)

49.**(D)**. Even with optimal pancreatic enzyme replacement, stool losses of fat and protein may be high. Fat should not be withheld from the diet, even when significant steatorrhea exists.

50.**(A).**

51.**(A).**

52.**(E)**. Spontaneous primary pneumothorax (no underlying cause) occurs in teenagers and young adults, more commonly in tall, thin males and smokers. Factors predisposing to secondary pneumothorax (underlying cause identified) include barotrauma from mechanical ventilation, asthma, cystic fibrosis, trauma to the chest, and severe necrotizing pneumonia.

53.**(C).**

54.**(D)**. Most parapneumonic effusions are due to pneumonia caused by Streptococcus pneumoniae, group A streptococci, or Staphylococcus aureus.

55.**(E)**. Exudates are characterized by high specific gravity and high protein (>3 g/dL) and lactate dehydrogenase (>250 IU/L) levels. They may also have a low pH (<7.2); low glucose level (<40 mg/dL); and a high WBC count with many lymphocytes or polymorphonuclear leukocytes.